

### Connecting to the Future

tion in the social and economic mainstream. Therefore, maintaining a robust Lifeline program may become even more important.

As technology evolves and competition increases, the public interest requires new mechanisms to ensure universally available and reasonably affordable residential service. At least two options are available. One is the adoption and use of a Universal Service Fund, crafted to ensure that all telecommunications providers pay an equitable amount toward Lifeline program costs and toward targeted support for especially high-cost areas.

This fund could be financed in a number of ways. One possibility would be to continue the present strategy of using the prices of nonbasic services to generate the revenue. In a multiprovider network of networks, the cost of the subsidies would have to be borne by all providers, perhaps through a fee set by the Public Service Commission. Since the revenues for Lifeline and other universal access programs are now included in telephone rates, the contribution to this fund would not constitute an extra "tax," or levy, on the system as a whole. Furthermore, universal access increases the value of the system to providers. It therefore makes sense to have them bear the costs of subsidizing universal access.

A second option is the adoption of a telephone gross receipts tax credit (like the joint legislative initiative proposed by the New York State Telephone Association, New York Telephone, and the Public Utility Law Project of New York), which recovers Lifeline program costs that otherwise would be borne in local exchange rates. There are other options ranging from reliance on existing state revenue sources to credit on taxes other than the gross receipts tax.

Therefore, the Exchange recommends the following:

- New York's historic commitment to universal service should be confirmed as a central goal of this state's telecommunications policy. Every New York citizen, regardless of income, disability, or location, should be ensured access to the package of telecommunications services that supports participation in this state's economic and social mainstream.

- a. As the marketplace forces of competition and technology continue to change the telecommunications landscape, the package of services that this state requires to be universally available must be periodically reassessed. When economic and social imperatives signal the time for a review of the state's universal service goals, the Public Service Commission should, if necessary, upgrade the basic telecommunications services package to ensure that it continues to meet our citizens' expanding needs.

## Connecting to the Future

- Telephone Lifeline, the program initiated and promoted by the Public Service Commission that serves as a national model for extending the basic telecommunications service package to those with limited means, should continue.
- To ensure that a fair and viable funding mechanism to support universal service goals remains available, during and after the transition to competitive telecommunications pricing, a new mechanism should be created. That mechanism might operate through a Universal Service Fund that would require equitable service obligations and/or financial contributions from all providers of common carrier telecommunications services, through a telecommunications provider credit on specified state tax obligation, or resort to general tax revenues, or another designated manner. If a Universal Service Fund is employed, it should be established in accordance with Public Service Commission criteria and should be administered by an entity authorized by the Commission and subject to its oversight. Individuals should be able to use benefits to pay for basic service from any provider.
- The level of access fostered by this fund should be reasonably similar to the level of access being provided to like market segments and communities, e.g., residences, schools, and healthcare providers, in areas where competition is effectively driving infrastructure deployment.
- The Public Service Commission should work with the Department of Social Services and the Office of Advocate for the Disabled to help New Yorkers with disabilities acquire necessary customer premises equipment. This might be done through modifications of the Department of Social Services' loan fund; it would also be appropriate to analyze how the Universal Service Fund could help meet this need.

Connecting to the Future

## 6. The Level Playing Field: Common Regulatory and Tax Ground Rules

### Unifying the Regulatory Process

*Advanced technology is breaking down traditional separations between the telephone, television, and information industries.*

The present regulatory and tax environment evolved during the time when telephony and television were distinct industries. Advanced technology, particularly digitization, is breaking down traditional separations between the transmission of sound (e.g., a telephone conversation), image (e.g., a television program), and computer data (e.g., a text file or a graph), and consequently, between the telephone, television, and information industries. Partnerships, alliances, mergers, and competition involving participants from all of these industries are occurring with increasing frequency. To achieve the multiprovider environment envisioned for New York, it is critical that the "playing field" between all transport service providers be level and fair. This requires a regulatory and tax environment that treats all transport industry participants fairly, yielding no competitor an unintended regulatory or tax advantage. *Policies should encourage participants to seek competitive advantage, rather than regulatory or tax advantage.*

The current regulatory structure in New York separates state-level regulation of telephone and cable television services between the Public Service Commission and the Commission on Cable Television, respectively. This dichotomy, although reasonable in an era when distinctions between these industries' services, technologies, and markets were clear, is becoming increasingly inefficient and ineffective as these industries' trends tend to converge. Their similar infrastructure deployment plans, their technical and marketing trials, the many recently proposed mergers between telephone and cable television interests, and their publicly announced market strategies all suggest that both industries perceive a clear synergy between telephony and cable television. As each industry increasingly offers both traditional telephone and cable services over integrated facilities and perhaps uses common marketing, services and maintenance organizations, it will become increasingly difficult for their separate state-level regulators to allocate costs adequately between services, to monitor service performance, to judge the adequacy of facilities and service deployment, to establish equitable standards and interconnection policies, and to constrain market power.

A common regulatory body with oversight over all providers of information transport would enhance New York's ability to foster an effective environment for competition and fair policies for interconnection, pricing, and infrastructure deployment. New York should begin immediately to build the unified policy framework that allows for a system of telecommunications designed to stimulate competition and innovation. Anything short of this will foster irrational distortions in the competitive market. In doing this, however, the Exchange does not recommend or foresee precipi-

## Connecting to the Future

tous changes that, arguably, could damage the standing of the cable industry in the eyes of the financial community.

Today cable television and telephone services are distinguishable and are subject to entirely different regulatory frameworks. To the extent any entity offers intrastate telephone services to the public, it is subject to the Public Service Commission's telephone regulation; to the extent an entity offers cable service, it is subject to separate rules for cable under the primary jurisdiction of the FCC as well as state (Commission on Cable Television) and local regulation. The merger itself will not necessarily change these distinct regulatory frameworks. Just as the FCC and a number of other states currently regulate, under different rules, both cable and telephone services, a common state regulatory body in New York would continue disparate cable and telephone regulation, as long as those service distinctions were to remain viable. A common regulatory body, however, will be better able than separate bodies to understand and deal with issues arising from the blurring of those distinctions that will inevitably occur as both industries seek to offer interactive, on-demand, video transmission services. Over time the Exchange believes this unified regulatory structure will improve the performance of the converging industries and their standing in financial markets as well as with their customers.

*Unified regulation will  
help create a level  
playing field.*

The Exchange therefore recommends the following:

- All providers of common carrier telecommunications transport services should operate under the same common carrier rules and bear the same common carrier responsibilities.
- Cable and telephone carriers maintaining monopoly power in particular service markets and/or regions should be restrained by regulatory oversight from exercising that power to inhibit the growth of new market entrants.
- New York should support cable-telephone cross-entry, as well as careful antitrust scrutiny of proposed mergers and regulatory restrictions on cross-subsidization from (regulated or unregulated) monopoly endeavors to competitive ones, to ensure the development and continuation of real and fair competition.
- In order to set and enforce policies that ensure open markets, fair competition, and adequate consumer protection, and to position New York to deal effectively with an evolving integrated provision of telephone and cable services, the Public Service Commission's jurisdiction should be expanded to include existing state-level regulation of cable television, to the extent permitted by federal law.
- To begin the process of accomplishing this change as quickly as

### Connecting to the Future

possible, yet in an orderly fashion, the governor should propose new legislation under which the regulatory functions of the Commission on Cable Television, together with the existing expert staff, would be transferred to the Public Service Commission, and should make other necessary changes in the public service law to enable the Public Service Commission to carry out this new responsibility. The organizational structure of the Public Service Commission should be reconfigured to reflect its new mission. Existing laws and regulations pertaining to traditional cable television would remain intact and would simply be enforced by a different regulatory body than at present. There would be no change in the scope of regulation of the content of electronic information. Generally, this means that the Public Service Commission would continue to confine its concerns with content to the ability of all legal information to access transport services on a nondiscriminatory basis. Lastly, there should be flexibility provided in the statutes to enable the Public Service Commission to deal with new issues, market entrants, and industry structural changes not currently envisioned. This legislative proposal would provide an additional opportunity for affected parties to present their views and concerns.

### Tax Policies

New York State and its localities place a disproportionate tax burden on telecommunications providers. New York State's telecommunications taxes are more than twice the nationwide average, and they are two to three times higher than the taxes imposed on most other businesses in the state. These taxes increase the price of telecommunications services and raise serious public policy issues because of their effects on economic development. Current tax policy has contributed to higher telecommunications prices in New York than elsewhere.

In addition to raising the cost of doing business, taxing telecommunications providers on their gross receipts rather than on their net incomes discourages competition. An alternative provider typically will not be immediately profitable nor generate net income, yet it will still be subject to a significant tax liability because it is taxed on its gross receipts. While New York—particularly New York City—offers the most advanced telecommunications market in the nation, taxation on gross receipts may discourage firms from entering the New York market to provide innovative and cost-competitive services.

Given New York's current fiscal condition, it will be difficult to reduce taxes on telecommunications in the near term. However, the state should refrain from further increasing the disproportionately higher taxes on telecommunications. Two goals should be to tax telecommunications carriers on a comparable basis with other businesses and to make the cost

## Connecting to the Future

of telecommunications in New York more competitive with that in other jurisdictions.

The Exchange offers the following recommendations:

- Tax policies should be reformed to eliminate investment disincentives, create a level playing field for all carriers and information providers, and make New York an attractive location for information-based businesses. More specifically, as fiscal conditions allow, the gross receipts tax should be phased out and replaced with a standard corporate income tax for all market participants.
- State and local taxes should not discriminate against certain communications providers and reduce the state's competitiveness when compared to other regions, including adjacent states.
- No additional taxes on telecommunications providers should be enacted.
- As a first priority, when economic conditions permit some form of tax restructuring, the aggregate volume of telecommunications taxes should be reduced to be more in line with national averages.
- Local governments should establish fair, reasonable, and nondiscriminatory terms for use of their public rights-of-way for commercial enterprises. Local processes should facilitate entry into the competitive marketplace, while accounting for the disruption associated with use of public property and ensuring that the community as a whole benefits from commercial use of its property. Fees should be fair and reasonable, nondiscriminatory and should not be used to grant an exclusive franchise. It is important that the Public Service Commission, working with local governments, seek to eliminate any overlapping regulation and to coordinate functions.

## Connecting to the Future

## 7. Benchmarks and Incentives for the Development of a Modern Infrastructure

*The private sector's performance should be evaluated relative to a set of "infrastructure benchmarks."*

The Exchange believes that the Public Service Commission's continued elimination of obstacles to competition is important, so that the private sector will rapidly and efficiently deliver the infrastructure necessary for the telecommunications capabilities New York requires. Given the importance of telecommunications to the state's future, however, it is imperative that the private sector's performance in delivering telecommunications capabilities be regularly and carefully monitored. The private sector's performance should be evaluated relative to a set of "infrastructure benchmarks" that identify the capabilities necessary for robust and vigorous economic growth and social progress in New York. These should be established, and periodically revised, based on an evaluation of the needs of various "communities" (e.g., business, residential, low-income, minority, persons with disabilities, and the elderly), available technologies, and comparisons of infrastructure development in other states and nations, particularly other international centers of commerce such as Tokyo and London, with which New York is in direct competition. Some jurisdictions, having chosen deployment strategies that rely more heavily on monopoly providers, risk overpaying for underutilized capabilities or soon-to-be obsolete technologies. Nevertheless, their experiences with these strategies will provide useful information for measuring our own progress.

A critical component of this monitoring must be a comparison of telecommunications capabilities available in various regions of the state. While not all regions will receive all capabilities simultaneously, we must guard against extreme disparities. In addition, there should be periodic reviews of market activity, including market shares and market power held by market participants, in the various regions of the state. If these reviews reveal either a general or regional failure of the competitive market to provide necessary telecommunications capabilities, policymakers should analyze the reasons for the deficiencies and on this basis determine effective remedies, including possible tax and regulatory initiatives. In particular, if regions or populations of New York are not traditionally well served, policymakers could use tax credits, possibly transferable ones, which would increase incentives for providers to supply infrastructure and to form joint ventures between existing telecommunications companies and new or small providers. Policymakers must carefully consider both the economic cost of prescribing infrastructure enhancements that the market has not produced and who should bear that cost.

The Exchange recommends:

- The Public Service Commission, in cooperation with the Office of Telecommunications (discussed below) and other interested par-

## Connecting to the Future

ties, should develop a set of criteria, or infrastructure benchmarks, against which New York's current and future telecommunications capabilities will be measured. In addition, a set of readily discernible measures of competition should also be established. The adoption of competition measurements will facilitate an orderly and manageable transition process in telecommunications markets. The application of measurements in different customer segments and regions of the state should include, among other things, market share and market power, barriers to entry and exit, availability of substitutes, and the number and strength of competitors. It is appropriate to use such data in the determination of the extent to which alternative forms of regulation might be justified.

- These infrastructure benchmarks should be periodically reviewed to reflect available technologies, telecommunications capabilities of other jurisdictions, the needs of all New Yorkers—including residential customers, business, and other users, such as persons with disabilities—and communities in different regions of the state. Periodic reviews are needed to provide policymakers with early warnings of significant marketplace malfunctions or distortions.
- While the benchmarks may suggest target levels and time frames for new service availability, they will not specify or mandate particular technologies. They will define standards by which to measure the success of a market-based telecommunications environment and provide a basis for discerning failure of the market to provide sufficient deployment of needed capabilities.

- The Public Service Commission's continual monitoring and assessment of the service quality of providers is critical, and it is important for the Commission to periodically establish service standards for those providers. Service quality is a broad concept that necessarily changes with technological advances and with evolving standards of reliability, disaster recovery, and consumer protection. It remains essential that all telecommunications service providers continue to meet these standards as prerequisites to participating in the competitive marketplace.

These benchmarks will allow the state to monitor the availability of services delivered through a competitive market. They will be reviewed periodically to make sure that they continue to reflect contemporary technology and market conditions. Further, the periodic reviews will provide policymakers with an early warning system to highlight significant marketplace malfunctions and distortions. This clearly is preferable to



### Connecting to the Future

discovering market problems after the fact, when their impact on the public is all too apparent and the tools needed to intervene are limited and more onerous.

Because the Exchange wishes to rely primarily on market-driven private investment to advance New York's telecommunications infrastructure, and because the prices charged for telecommunications services are a major determinant of investment return, the methods and framework of regulating telecommunications prices are critical to the success of the Exchange's overall policy.

Under the monopoly framework, prices were set by state public service commissions with two goals in mind. One was to protect consumers from the excessive rates that a single provider could exact in the absence of competition. The other was to allow the telephone companies to recover their prudently incurred costs, plus a "fair" rate of return. This approach allowed companies to pass on the costs of their investments to users. It has also been argued that this system encouraged companies to incur excessive costs. Due to the absence of competition and a customer desire for stable and predictable telephone costs, this system traditionally restricted price flexibility. It also required greater regulatory guidance of investment.

As part of the process of moving toward more competitive telecommunications markets, and in order to maximize market-based incentives, the Public Service Commission and other regulators across the country have reconsidered rate-of-return regulation and have moved toward "incentive" or "performance" regulation schemes. Possible alternatives include rate moratoria, social contracts, deregulation, price caps, and rate banding. These regulatory options generally give dominant telecommunications providers greater price flexibility for competitive services but have tighter pricing rules for monopoly services. At the same time, they entail less investment oversight but do not guarantee fixed rates of return on company assets, thus increasing both the risks and rewards of new investment for shareholders. These new regulatory approaches reflect an increased recognition by policymakers of the key strategic importance of telecommunications for economic competitiveness and social growth.

*Regulators must  
carefully monitor the  
competitive markets.*

These alternative regulatory schemes should be considered as significant competition grows in the New York telecommunications market and as a means to encourage increased private investment in telecommunications. When structuring these new regulatory systems, regulators must ensure that the risks of investment in new telecommunications services are borne by the shareholders and that ratepayers are not exposed to the investment risks associated with the offering of competitive services. Prices of basic services and those network functions where there is little or no competition but which are needed by competitors should continue to be regulated, and regulators should use available regulatory mechanisms to ensure that such services are provided efficiently. Regulators must also

## Connecting to the Future

carefully monitor the transition to more fully competitive markets, lest an uneven balance between the level of competition and the degree of regulation results in unacceptable results, e.g., "rate shock," or some form of market failure, including inadequate investment in the network. In particular, they must ensure adequate service availability in all geographic areas, and all carriers must share fairly in the costs necessary to ensure and maintain adequate service availability on demand. Under the principle of regulatory parity each competitor would be obliged to equitably provide either facilities or an equivalent financial contribution to the costs of ensuring that essential telecommunications services are available on demand, i.e., carrier-of-last-resort obligations. No competitive advantage or disadvantage results from equitably sharing these collective obligations.

To effectively manage the transition to greater competition, New York's system of telecommunications regulation must be able to adapt to changing market conditions. This should include not only considering alternative forms of regulation for dominant telephone companies, but also reduced regulation of competitive services and providers. At the present time, the degree of competition in various telecommunications markets varies widely (e.g., there is significant competition in inter local access and transportation(LATA) toll markets, less in intraLATA toll, and almost none in local exchange services). Regulators should be afforded the flexibility to adjust the degree of regulation, particularly of prices, specific services, and providers, to reflect competitive conditions appropriate to the degree of meaningful customer choice in each market. This flexibility should be applied only after full investigation of the competitiveness of each market and should be consistent with the degree of competition found. Limited competition may justify limited flexibility, while greater competition would justify greater flexibility. The framework should vest authority to reregulate, should market dynamics later prove inadequate to protect consumers.

It is particularly important that the level of competition in each market and its resulting effect on consumers be carefully monitored. Ongoing review of market conditions is critical to ensuring that all consumers continue to receive the high-quality, affordable services they require and that New York's pro-competitive policies do not lead to the development of unregulated monopolies or oligopolies. The Public Service Commission's transition protection principles and transition monitoring plan provide an appropriate framework for this purpose.<sup>32</sup>

The Exchange believes that market incentives, supplemented by the benchmark process, constitute a sound long-run investment strategy. The Exchange specifically notes widespread support within the business community and elsewhere for deployment of ISDN. The Exchange shares this support within the context of the market incentive process, which appears to be taking hold with respect to ISDN. Now that ISDN standards have been finalized, hardware and software vendors are beginning to respond, and it appears that ISDN can be attractive to a significant body of customers.

**Connecting to the Future**

- The Exchange recommends that reasonably affordable ISDN services (or their equivalent) should be made accessible as quickly as is technically and economically feasible to all interested customers served by a digitally capable central office switch, and that deployment should continue as other switches are upgraded to achieve network efficiencies.

Telephone companies in New York and elsewhere have already deployed much of the underlying digital switches and Signaling System 7, the technological building blocks for ISDN. Quickening the pace of ISDN deployment will offer benefits to users, since narrowband ISDN has the potential to substantially increase, by a factor of ten, existing analog transmission speed.

It is the capabilities now supported by ISDN that the Exchange wants to encourage. The deployment of more advanced digital technologies would be welcome. In any case the Exchange expects these services to be offered on a basis that will not cause any burden on basic service rates.

---

Connecting to the Future

## 8. Toward an Active Labor Force Strategy

State policies that encourage competition in telecommunications will have significant implications for the industry's labor force. One of the most important effects will be to increase the use of telecommuting—which will contribute to labor market flexibility. Studies show that telecommuting can increase productivity, save on transportation costs, and may provide quality-of-life benefits for employees. At the same time, telecommuting, by enabling larger numbers of employees to work at home with sophisticated equipment and without supervision, will pose new challenges to the state's privacy, labor, and safety laws. While realizing that the full benefits of telecommuting will require a modernized infrastructure, New York has already begun to encourage telecommuting with the Clean Air Compliance Act.

The passage of the Americans with Disabilities Act has focused increased attention on ensuring that people with disabilities have opportunities to work. The act contains provisions and guidelines regarding the appropriate implementation of telecommunications technologies by employers, private businesses, and the government. The state can move ahead by educating employers about the benefits and challenges of telecommuting by encouraging demonstration projects, and by examining the need for new protective labor legislation where appropriate.

While telecommuting may offer benefits to many New Yorkers, changes in the telecommunications industry could create problems for the industry workforce. Increased productivity, while a sign of economic health, may mean fewer workers in the traditional sectors of the industry—especially in the monopoly telephone companies facing genuine competition for the first time. The changing technology, while essential and inevitable, may undermine the status of older workers whose skills are becoming obsolete and may require younger workers to learn new skills in order to become employable and productive. The entrance into the telecommunications marketplace of new providers seeking competitive advantages and market niches could inspire a new era of price competition, placing downward pressure on wages and benefits throughout the industry and undermining a traditional and stable source of middle-class jobs. While driving the modernization of the infrastructure, the increased competition and associated shifts in market share among competitors could accelerate the already evident trend in worker dislocation.

The transition to a competitive telecommunications marketplace creates new challenges for employers and employees, which, unless met, could frustrate even the most innovative state telecommunications policy. For example, continuous labor dislocation and corporate downsizing not only place costly burdens of unemployment on the state; they have the potential to damage worker morale and adversely affect the quality of the service provided to customers. Moreover, an anxious workforce will be less

*Changes in telecommunications could create problems for the industry workforce.*

Commission continues to regulate. Therefore, the Exchange recommends that the governor establish a new program to promote diffusion.

1. To assure that New York reaps the economic and social benefits of telecommunications advances, the state should implement a vigorous program for diffusion of telecommunications technology and applications. Since diffusion activities fall outside the Department of Public Service's duties, the Exchange recommends the governor establish a new state Office of Telecommunications to organize and manage the state's diffusion program. This Office would complement Public Service Commission efforts by focusing on nonregulatory telecommunications policies. Its small staff would include experts in telecommunications, finance, technology diffusion, and organizational change.

Locating this initiative within the Office of Economic Development, will ensure that telecommunications diffusion receives high priority. Operating funds for the Office would come from the consolidation of existing programs and the redeployment of existing funds, thus not imposing any additional burden on taxpayers.

One of the first priorities of the Office will be to conduct studies to identify barriers to diffusion in different economic and social sectors, including: primary and secondary schools, healthcare providers, small and medium-size businesses, persons with disabilities, community-based organizations, foreign-language speakers, inner-city and rural areas, R&D institutes, and state and local governments. These studies will aim to design initiatives to overcome these barriers, including identifying opportunities for demonstration projects.

It will be important for the Office to make the diffusion program as inclusive as possible. ~~Minority- and women-owned telecommunications companies can play an important role in helping to serve inner-city areas and to promote competition and diversity within the industry. In some cases the private sector may be unwilling to support projects that serve New York's public interests. For example, community development groups or consortia of small businesses may have difficulty accessing private investment to upgrade their systems. To assist these firms, the Office will identify means to provide them with access to capital, ways to facilitate capital formation in this sector of the economy, and support in overcoming barriers faced by new entrants, including minority- and women-owned firms. In this effort the Office will work with agencies such as the Urban Development Corporation, the Port Authority, the Dormitory Authority, and the Job Development Authority. If such development projects spread new technology to significant social or economic sectors, then Office personnel will seek public resources at the state and federal level.~~

*Minority- and women-owned telecommunications companies can play an important role . . .*

Building up the capabilities of small and medium-size businesses to use telecommunications will be a critical function of the Office. The Office will identify ways to organize networks between small suppliers as well as

between them and purchasers of manufactured goods.

The Office will serve as a clearinghouse to disseminate information regarding telecommunications applications and standards. For example, it will promote the awareness of the value of "smart buildings," which are designed and constructed in ways that facilitate the cost-effective use of advanced telecommunications.

A key mission of the Office will be to advance the use of telecommunications within government by helping to coordinate the initiatives of public agencies, including the Departments of Education, Health, the State University, and the Office of General Services.

Though the actual implementation of state telecommunications policy will continue to rest in the hands of concerned state agencies, the Office can play an important support role. The Office of Telecommunications will work with the Department of Economic Development, the Urban Development Corporation, and the Job Development Authority to ensure that state-supported economic development programs, including industrial parks and economic development zones, recognize the importance of modern telecommunications.

One of the missions of the Office will be to help shape policy. For example, the Office will help set benchmarks by making ongoing comparisons of telecommunications deployment in New York with that in other states and countries. It will make recommendations to the governor, the legislature, the director of economic development, and other state agencies regarding the role of telecommunications in economic development and policies to support diffusion.

As a way to help keep New York on the cutting edge of telecommunications, the Office will work with providers, users, universities, and Foundation for Science and Technology to facilitate cooperative research and development projects. An important consequence of such projects will be the growing in-house expertise of the Office of Telecommunications, making it an increasingly useful and effective state resource.

*The Fund will be a mechanism to sponsor and support diffusion*

*2. A Diffusion and Labor Market Transition Fund should be established as a mechanism that will help finance projects demonstrating how modern telecommunications can promote economic growth, improve the quality of life, and facilitate innovative labor force strategies. Managed by an independent, private, not-for-profit organization, the Fund will be a mechanism to sponsor and support diffusion activities. It will also be a means of facilitating capital formation and access for small and minority-owned telecommunications companies. It will coordinate its work with other technology diffusion programs—the Centers for Advanced Technology, manufacturing extension services, training programs, and local economic development corporations.*

Flexible manufacturing networks, which employ high-capacity telecommunications equipment, are an example of the kind of promising

project the Fund should support. By linking groups of related companies to their suppliers and customers, flexible manufacturing networks allow firms to innovate quickly, meeting changes in market demand, and to manage inventories efficiently. In Ohio, the Appalachian Center for Economic Networks (ACEnet) is helping companies compete and expand, leading to regional economic development. New York could give its businesses a competitive edge by assisting in the formation of similar networks. Lessons and insights from such endeavors would be disseminated widely; furthermore, they would prove invaluable in the ongoing process of formulating statewide telecommunication policies.

New York's universities and research institutions offer rich potential for diffusion efforts. The Office should support university research initiatives that develop, extend, or improve telecommunications. These would include working with NYSERNet to support the Gigabit Networking Project (networks with very high-speed transmission capacity), and the "third tier" network program (increasing high-bandwidth access to the Internet). These would allow greater use of the advanced transmission capacities of the "first tier" federal information superhighway, and "second tier" statewide networks (i.e., NYSERNet), both of these being components of the Internet.

*New York could give its businesses a competitive edge by helping them form flexible manufacturing networks.*

Resources could come from a variety of existing sources, including federal research and development funds and telecommunications providers. The Diffusion Fund would utilize development money from companies that want to cooperate in efforts to spread the use of modern telecommunications technologies.

Where appropriate, bidding for projects would be competitive and open. The Diffusion Fund should work to ensure that small businesses and minority-owned enterprises are included in such bidding and included in innovation and research activities.

3. *An Advisory Council to the Office of Telecommunications, composed of representatives from local governments, businesses of all sizes, community-based telecommunications organizations, New Yorkers with disabilities, consumers, schools, libraries, healthcare providers, and telecommunications firms, should be created.* The Council would be divided into working groups addressing key issues, including education, healthcare, and the public sector's use of telecommunications. The Council should reflect the diverse needs of New York's population and include representatives from different areas of the state. With a solid grounding in the actual telecommunications needs of a wide array of private and public sectors, the Advisory Council would ensure that the Office of Telecommunications would remain focused on practical solutions to key problems.

4. *A portion of the Diffusion Fund's resources should be invested in projects to help New Yorkers displaced by telecommunications innovations learn new skills*

and find work in information-intensive industries. Modern telecommunications will mean greater efficiency and competitiveness for New York firms, but that inevitably implies some dislocation and job losses. In partnerships with business-labor consortia, the Fund's projects would showcase telecommunications technologies designed to expand opportunities for workers, to improve business competitiveness, and to enhance the quality of life in New York.

Telecommunications technologies embody exciting opportunities for New Yorkers with disabilities. Modern telecommunications will enable them to participate more easily and more fully in mainstream economic and social life. New York's diffusion policies should help New Yorkers with disabilities acquire the telecommunications capabilities they need to participate in the full range of educational, healthcare, employment, and social services.

*Modern telecommunications will enable New Yorkers with disabilities to participate more easily and more fully in mainstream economic and social life.*

Through their ability to transmit information rapidly over great distances, advanced telecommunications can enhance the lives of individuals for whom travel, mobility, or vocal communication presents difficulties. The new technologies will allow them to actively take part in classes, meetings, training programs, and seminars; to engage in leisure, social, and recreational pursuits; and to work from their home computers.

Policies that support universal access to basic services, wider diffusion of advanced services, and targeted support for telecommunications use in healthcare and education are of critical importance to New Yorkers with disabilities. From their perspective the most important policies may therefore be those promoting widespread diffusion of the technologies supporting telelearning, telemedicine, telecommuting, and teleconferencing. In addition the Office of Telecommunications can specifically design initiatives to assist people with disabilities.

5. The Office of Telecommunications should work with other agencies, including the Office of Advocate for the Disabled, to improve New York's compliance with the Americans with Disabilities Act. By encouraging the spread of technologies that help disabled persons participate fully in the economic and social mainstream, the Office of Telecommunications can greatly advance the Act's goal of preventing discrimination against the disabled. Further, through the Diffusion Fund, the Office can address the Act's specific provisions and guidelines regarding the appropriate deployment of telecommunications technologies by employers, private businesses, and the government.

The work of the Office of Telecommunications must reflect New York's traditions of inclusiveness. Thus, it must be sensitive to the fact that many New Yorkers speak languages other than English.



6. *A portion of the projects of the Diffusion Fund should be allocated toward non-English services and the development of non-English applications. Populations reliant on languages other than English are a significant, vibrant, and growing portion of New York.*

#### **Broad-Based Diffusion: Inner Cities and Rural Areas**

New York's diffusion policies must reflect its traditions of inclusion. The Office should support extension services, possibly in cooperation with the Industrial Effectiveness Program of the Department of Economic Development, to ensure diffusion of telecommunications technology to small and medium-size businesses, including minority-owned businesses. Outreach efforts will also need to include schools, local governments, and community-based organizations. The Office should also ensure that the education and health initiatives, discussed in more detail in the next chapter, are geographically balanced and inclusive of inner cities and rural areas.

Although these regions and groups would benefit enormously from modern telecommunications, they often lack the financial and technical resources needed to acquire new systems. For example, the Office could institute programs to increase access to the Internet, facilitating both commercial and nonprofit use of the network. The Fund would back projects placing modem-equipped computers in libraries, public schools, and medical care facilities while training employees of these institutions how to use—and teach to use—the Internet.

## 10. Strengthening Education and Healthcare

Modern telecommunications can greatly improve New York's education and healthcare systems. First, by facilitating the rapid spread of information across the state, telecommunications can make access to educational opportunities and to healthcare more equitable—helping realize the goal of social inclusion. As noted in Chapter 1, students in school districts isolated by geography or by income will be able to enjoy classes, lectures, and debates now reserved for students in more central districts. Better access to education and healthcare can remove barriers to full participation in social and economic life, especially for rural areas, the inner city, persons with disabilities, and for New York's elderly population.

*Telecommunications can make access to educational opportunities and to healthcare more equitable.*

While telecommunications technologies are becoming essential for persons with disabilities, the Exchange emphasizes that modern telecommunications cannot be used as a substitute for the inclusionary setting of classrooms, workplaces, or boardrooms. There is no substitute for the benefits of face-to-face interaction with teachers, fellow students, bosses, and co-workers. Lives are enriched by forming friendships and work relationships on the job and at school. Telecommunications should not be used as a substitute to absolve government agencies of their responsibilities to provide access. -

Telecommunications can also improve the quality of education and healthcare available to all New Yorkers, thus meeting another key policy goal. Telemedicine can facilitate decentralized community-based and school-based healthcare. Comprehensive school-based health and social services have proven to be invaluable for inner-city neighborhoods such as Washington Heights in New York City.<sup>13</sup> Bringing these quality-of-life benefits to all of our diverse communities will make New York a better place to live and work.

Finally, modern telecommunications can dramatically cut the cost of providing quality education and healthcare. In Chapter 1 the Exchange described how advanced telecommunications networks can reduce the time and expense needed for bill keeping, record maintenance, and document transportation in healthcare. In an era of tight budgets and sharp international competition, such savings will boost New York's business competitiveness.

These benefits—social inclusion, quality of life, and cost reductions—depend on new investments in healthcare and educational networks, as well as on policies to increase coordination and promote diffusion. The situation in education exemplifies some of the problems. New York already has many telelearning initiatives focusing on public colleges and universities and some initiatives for elementary and high schools. However, the approach so far has been local and fragmented. New York's educational system still lacks an integrated and cost-effective broadband network capable of interactive transmissions between institutions anywhere in the

state. Moreover, while libraries have made some efforts to link themselves to educational and medical information resources, these initiatives have not been comprehensive. What is needed now are measures to foster an integrated statewide network of networks. This will require additional resources for infrastructure, equipment, applications, diffusion, and training. Given their budgetary constraints, most school districts, libraries, and many medical facilities will be unable to pay for more than a small portion of such investments.

It will also require a comprehensive process to develop a strategic plan for telecommunications in research and education. The Board of Regents and the Department of Education are now establishing such a process, which will elicit participation from the education, research, and government communities.

The proposed Office of Telecommunications and the Diffusion Fund (see Chapter 9) can play key roles in bringing the benefits of the telecommunications revolution to New York's education and healthcare systems. Together, the Office and the Fund will have the technical expertise and the ability to procure resources needed to foster statewide telecommunication networks. Within the Advisory Council to the Office, subcommittees should be established to develop solutions to problems in education, healthcare, and libraries. Composed of representatives from academia, industry, labor, the Department of Education, the Department of Health, other state agencies, minority communities, persons with disabilities, and elderly New Yorkers, these subcommittees will ensure that the Office's proposals are practical and well aimed.

## Education

*In cooperation with the Department of Education and local governments, the Office of Telecommunications should develop switched broadband telelearning projects to link New York's schools and higher education facilities, particularly those in inner-city and rural areas. The NYClassNet project, initiated by the New York City Department of Education, has established interactive video links between three New York City high schools and the Borough of Manhattan Community College. This kind of program, if expanded, can offer high-quality and cost-effective ways to equalize educational opportunity across the state—in a period of constrained local school budgets.*

2. *The Office of Telecommunications should also work to create an open architecture statewide to ensure connectivity in both private and government education networks. A first step would be to integrate the existing state educational networks, such as SUNYNet, the New York State Technology Network Ties (TNT), NYSErNet, SUNYSAT, public television, New York Network, and Learning Link. Local networks—including the New York*

Community Learning and Information Network (NYCLIN), the New York City distance learning network (NYClassNet), the Hispanic Information and Telecommunications Statewide Network, cable TV systems, the Strategic Telecommunications Initiative in the rural southern counties, and the networks sponsored by the Board of Cooperative Educational Services, and the library networks that are sometimes connected to them—could then be linked into the statewide network. By joining the various education initiatives into a network of networks, New York can enrich and expand the learning opportunities of students throughout the state.

*A unified network could cut costs and improve efficiency.*

3. *The Office of Telecommunications, the Department of Education, and other state agencies should also help establish test bed projects to explore the requirements and benefits of switched broadband networks serving community development organizations, libraries, museums, and public broadcasters. Networks should first be established in an inner-city community, a rural area, and in Albany, with broadband links between them. Today's practice of maintaining separate telecommunications systems for education, healthcare, public agencies, social services, criminal justice, and economic development is inefficient and costly. Not only would a unified network cut costs and improve efficiency, it would also facilitate interagency cooperation, while offering the convenience of one-stop shopping to citizens participating in the project.*

4. *The Diffusion Fund should support the development and deployment of infrastructure needed to connect local education agencies, schools, colleges, and universities to tomorrow's electronic superhighways. A first step would be to increase the ability of education, research, and other public-sector institutions to use the Internet by enhancing third tier local access network infrastructure. Enhanced third-tier links, such as Mount Sinai Medical School's NYSErNet-financed connection to the Internet, have been indispensable for research, which has required data and image communications with researchers at Scripps Howard Laboratory in San Diego.*

*Other applications and education initiatives also deserve support from the Office of Telecommunications and the Fund. For example, the New York Library Association, the State Archives, and the New York State Library have begun efforts to create electronic doorway libraries, which would provide on-line access to marketing, financial, and agency databases. Such electronic doorways would also provide access to the Internet and to on-line community bulletin boards.*

*The goals of improving the quality of life and promoting social inclusion will be compromised if important information services become unaffordable, or if currently free services are converted to fee services. The Office of Telecommunications should, therefore, work with the Public*

Service Commission to develop guidelines to ensure that public information resources now available in print at no cost, such as government documents, remain free as they are converted to electronic form.

5. *Working with the Department of Education, SUNY, unions, businesses, and library associations, the Office of Telecommunications should begin to develop telecommunications-based applications for teaching and learning, and, in particular, for training, retraining, and apprenticing New York's workforce. These applications should cultivate the use of telecommunications technology to deliver these services and resources beyond the classroom and library to the home and the workplace. Using telecommunications to advance the skills of workers and managers can help New York firms achieve greater economic competitiveness.*

6. *New York should also consider how to ensure the delivery of educational services across the networks. Such measures might include stipulating that a reasonable percentage of each system should be dedicated to the delivery of educational services, including non-English services.*

## Healthcare

As the nation debates healthcare reform, policymakers need to consider how advanced telecommunications can help New York meet the twin needs of expanding access and controlling costs. Greater use of telecommunications can improve service to populations that are difficult to reach and currently poorly served, facilitate the spread of services by scarce medical specialists, and reduce the time and money spent on paperwork. While many of the issues of applications in healthcare are complex, the Exchange believes that a number of issues are worthy of consideration. As preliminary examples the Exchange offers the following:

*Advanced telecommunications can help New York expand healthcare access and control costs.*

1. *The Office of Telecommunications should work to remove regulatory barriers to development and diffusion of telecommunications-based medical applications. For instance, the Office should work to ensure that federal healthcare reforms support Medicare and Medicaid reimbursement for telemedicine, bearing in mind the cost-effectiveness of these methods. Outdated requirements need to be relaxed to permit better use of existing resources and improve service to populations that are difficult to access, such as prisons, mental institutions, inner-city schools, and rural communities; to provide for input by scarce physician specialists on a timely basis; and to increase time for patient care and to reduce time spent on paperwork.*

2. *The Office of Telecommunications and the Fund should support and*

collaborate with the Department of Health and public and private healthcare providers to develop an interactive personal health information system. Such a system could provide New Yorkers with individually targeted health information and advice around the clock. Gathering data for medical research would be facilitated, and complete confidentiality could be assured.

Modern telecommunications can dramatically improve the capabilities of rural and inner-city healthcare facilities.

3. *The Office of Telecommunications and the Fund should also work with the Department of Health to deploy advanced technology and applications among healthcare providers. Modern telecommunications can dramatically improve the capabilities of rural and inner-city healthcare facilities, which often lack the expensive technology and expertise of major medical centers. For example, the Rural Health Networking Project links 14 hospitals and clinics in western New York. By transferring medical images and diagnostic work, the network eliminates many trips by patients to Buffalo for treatment.*

4. *The Office of Telecommunications and the Fund, working with state and local departments of health, education, social services, and other community-based public and private organizations, should promote telecommunications networks to inner-city and rural school-based health, education, and social service clinics. For example, enhancing telecommunications linkages between the four school-based clinics in New York City and Columbia Presbyterian Hospital, with whom they are affiliated, could improve the quality and cost-effectiveness of their services. Some libraries in New York already offer access to medical databases. School-based and selected community-based clinics should also be able to do this.*

5. *The Office of Telecommunications should work to achieve greater interconnectivity between healthcare providers on the Internet. It should work with the New York State Department of Health, the New York State Medical Association, and the Hospital Association of New York State to raise the level of computer literacy among lay persons and professionals by facilitating access to, and training in, using the Internet. This could improve communication between county and state health departments. It may also be possible to replace local bulletin board systems currently used for professional distribution of health advisories with more efficient Internet bulletin boards.*

6. *The Fund should facilitate and support telecommunications-related healthcare and education investments by identifying and increasing options, including those available through the federal government, through public-private cooperation on joint projects, and through direct public funding from state agencies and public-benefit corporations of the state, such as the Medical Care Finance Agency through the Facilities Development Corporation and the Dormitory Authority.*

## 11. Making Government Work Better

New York is now facing one of its most difficult economic challenges in decades. New York State, the nation, and the world are gripped by persistent unemployment, shifts in global resource use and environmental concerns, and cultural changes. Government, like private businesses, will be severely stressed in this period of transition. Meeting these challenges will require profound changes in the methods used by government.

The use of telecommunications and information technology may be a key to this transformation. Like the private sector, the public sector must change how it works, particularly with regard to cost-efficient sharing of information and resources through telecommunications. Just as the private sector is moving to an open network of networks, so must the public sector.

New York government is the largest single consumer of telecommunications in the state, buying about \$100 million worth of services and equipment each year. Through its aggregate purchasing power, government can potentially reduce the telecommunications costs of its operations, improve its delivery of public services, and help shape the future of New York's telecommunications infrastructure. In particular, state government can promote the construction of smart buildings, with built-in telecommunications and energy conservation features, through its financing of public-sector buildings such as dormitories and government offices. State government procurement can also serve as a driving force in ensuring equal access to telecommunications and information technology by persons with disabilities.

*New York government  
is the largest single  
consumer of telecommu-  
nications in the state.*

To realize these benefits, New York government needs to develop a coordinated strategy to guide its telecommunications purchases. So far, however, government agencies have invested in different and uncoordinated networks. For example, SUNYNet, NYSErNet, and TNT all serve New York's educational system. EMPIRE NET and CAPNET both provide data and voice telecommunications services to many state agencies. Meanwhile, CRIMNET and NYSPIN (New York Statewide Police Information Network) are dedicated to criminal justice activities. Although these networks cover roughly the same geographic areas and could be configured to handle the same type of data and voice traffic, they are operated separately. In addition to these larger networks, agency and local government networks abound. Some use leased lines in the public switched network, some depend on private dedicated facilities, and all are administered separately. Many of the state's public networks, both large and small, are further isolated from each other by incompatible architectures and standards. Instead of a network of networks, we simply have agencies going their own ways in an uncoordinated fashion. Integrating them—actually creating a public-sector network of networks—will be a difficult process.

In order to coordinate telecommunications policy and procurement within state government, the Exchange recommends that the governor create an interagency telecommunications council that will harmonize state agencies' investments in systems, equipment, and services. Many in government have now begun to move toward better coordination of telecommunications policies. The New York State Forum for Information Resource Management has focused on statewide infrastructure issues. In 1992 the Forum, composed of representatives from state and local governments, published a report titled "Telecommunications: A Vital Infrastructure for the New New York."<sup>34</sup> In the report, the Education Department, the State University of New York, the Office of General Services, and others discuss several projects to test the feasibility of merging the educational networks, EMPIRE NET, and other public-sector networks. In a complementary initiative, the Department of Labor has formed an interagency group to establish electronic links between participating state agencies. Meanwhile, New York City has created an Department of Telecommunications and Energy to address government and business needs. Finally, 11 southern counties have organized to develop a regional telecommunications plan.

*With modern telecommunications systems, government will be able to improve the delivery of services to the public.*

These endeavors demonstrate that government policymakers have begun to traverse the terrain leading to an eventual network of networks. There are many potential benefits: With modern telecommunications systems, government will not only be able to quicken communication between state offices and speed the processing of data, but it will also be able to improve the delivery of services to the public. Demand for more integrated services is rising at the same time as New Yorkers are calling for a more efficient government. By combining and reducing the costs of government services, a coordinated telecommunications policy can meet both objectives. Aggregating the state's market purchases of telecommunications services—acting as a single customer—will particularly benefit small agencies and local governments. They will enjoy the price discounts otherwise reserved for major buyers of telecommunications services.

~~Some potentially far-reaching governmental reforms depend on the~~  
modernization and integration of the state's telecommunication system. The Department of Education's New Compact for Learning envisions a groundbreaking degree of communication and integration between public schools, colleges, universities, the department, and the private sector; however, the compact will require an extensive telecommunications network that remains only on the drawing board. Another example is the state senate's proposal for information kiosks, intended to make government resources easily available to New Yorkers everywhere. Today many of those resources are confined to agency networks, which are difficult to access from outside.

A growing reliance on electronic sources of information will require



programs and policies to ensure that all citizens have reasonable access to essential information. This will mean ensuring access not only to equipment and network capabilities, but also to electronic databases. While programs to provide universal access to telecommunications services and to aid in the diffusion of necessary terminal equipment can enhance the physical ability to access electronic information sources, many of those sources themselves may impose charges that effectively exclude significant communities, particularly those with special needs. Today those who cannot afford to buy all the books and other printed materials they require can satisfy most of their information needs through various "free" libraries. Tomorrow's environment may require that such information be equivalently affordable in electronic form. Innovative and creative approaches need to be developed to ensure that access to information remains affordable in the electronic age. In particular, state government initiatives should allow New Yorkers with disabilities to have telecommunications and information access comparable to that which is available to other persons.

#### **Shaping the Future of New York's Public Telecommunications Infrastructure**

As the largest telecommunications customer in New York, government can influence the shape of tomorrow's infrastructure. For example, since government is a consumer in every corner of the state, its purchases ensure that telecommunications companies deliver services to even the most remote areas. Equally important, public-sector purchasing guidelines can help define market standards that promote public goals. Washington limits federal purchases of technology based on proprietary communications standards, thus encouraging companies to develop open standards for a national telecommunications infrastructure. Similarly, New York could stimulate competition by requiring that the telecommunications equipment it buys must meet standards for interconnection.

~~New York government can take several steps to make sure that its enormous purchasing power advances the goal of establishing a network of networks.~~

*Government can influence the shape of tomorrow's infrastructure.*

1. *The governor should create an interagency telecommunications council to coordinate state telecommunications policies. The council will ensure that purchases of telecommunications equipment and services by state agencies are coordinated and cost-effective. Coordinated procurement practices can speed the transition to an open network of networks. In addition, the council can work to ensure that agencies carry out open-procurement policies, so that all New York enterprises, including women- and minority-owned businesses, are able to participate in, and benefit from, the new, competitive environment.*